THE OPERATIVE TREATMENT OF GALL-STONES IMPACTED IN THE CYSTIC OR COMMON BILE-DUCTS.

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IT is not my purpose to attempt any systematic or complete description of the many methods employed by surgeons to remove impacted gall-stones from the lower biliary passages, but rather to draw attention to some of the chief dangers and difficulties met with, and to make some suggestions as to overcoming them.

Some of the Difficulties and Dangers.—(1) The difficulty of finding the gall-bladder may be great, owing to its diminution in size and to its lying hidden in a mass of adhesions resulting from old inflammation.

(2) The gall-bladder having been exposed, it may be found so shrunken and its seat so deep that it becomes an impossibility to bring it to the parietes, and extremely difficult to carry out the operative manipulations indicated.

(3) The same remarks apply, in an exaggerated degree, to the case of stones impacted in the cystic or common bile-ducts.

(4) Other things being equal, the dangers of operation increase *pari passu* with the time consumed.

In cases of stone in the cystic or common bile-ducts, where it is possible to suture the gall-bladder to the parietes, it is my practice to endeavor by the usual means to deliver these obstructions through the gall-bladder. If, however, this proves difficult and consumes much time, the gall-bladder is stitched to the abdominal walls and the extraction of the calculi left to a second sitting.

Owing to many causes,—*e.g.*, shrunken gall-bladder, overlapping liver, extensive adhesions, etc.,—it is often impossible to carry out the procedures spoken of above, and it is with the methods of treating these extremely difficult cases that this paper deals.[1]

(*a*) *Methods of Removing the Stones from the Duct.*—(1) Removal of the stone through a wound in the gall-bladder.

This method is the best where possible, but owing to the firmness with which the duct wall may grasp the concretions, or to the narrowness of that portion of the duct lying between the bladder and the stones, it is frequently impracticable.

(2) The gall-bladder having been opened, the stone may be broken *in situ* either by padded forceps acting through the duct-wall or by needling. The fragments are removed through the wound in the gall-bladder. This method has been successfully employed, especially by Mr. Tait. Kehr criticises this operation on the ground that the complete removal of the detritus is often impossible.

(3) Stones situated low down in the common duct may be pushed into the intestine by a probe introduced through the incised gall-bladder. Abbe has done this successfully.

(4) Removal of stones through a wound in the duct itself.

When it is impossible or extremely difficult to remove stones from the ducts by the usual means through the gall-bladder, it is best to incise the duct directly over the stones and so remove them rapidly.

(*b*) *Methods of Treating the Wounded Gall-Bladder or Duct.*—(1) *Suture.*—As a rule, when it can be readily carried out, the best method of treating wounds of the gall-bladder and ducts is by means of suture. In many cases, unfortunately, the wounds to be treated are so deeply seated and in such a confined space that this method consumes very much valuable time and the closure is imperfect. The importance placed on drainage by Mr. Thornton shows that even such a skilled wielder of the needle as he mistrusts his own suturing under such circumstances.

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[1] The subject of forming an anastomosis between the intestine and the gall-bladder or a hugely-distended bile-duct is, of course, excluded from this paper, since such operations are impossible except when the gall-bladder is of fair or the duct of huge size.

Another difficulty which occasionally confronts the surgeon is to distinguish, at the bottom of a deep and narrow pit, the wounded duct from oozing adhesions recently divided.

(2) *Cholecystectomy.*—Excision of the gall-bladder, when it is contracted or its walls are so friable that stitches will not hold, has been strongly recommended by Langenbuch and others. When the stone for which we are operating is situated low down in the cystic or in the common duct, I fail to see any advantage to be obtained from the removal of the gall-bladder commensurate with the disadvantages incident to loss of time.

A danger common to the suture method and to cholecystectomy is that it is manifestly impossible, in all cases, to know positively that all obstruction to the flow of bile into the intestine has been removed. When a temporary fistula has been provided, the dangers from this source are minimized.

Riedel and Winiwarter both seem to realize this, since, while recommending cholecystectomy, they merely temporarily ligate the cystic duct, and, using the omentum, form a funnel of peritoneum leading from the point of ligation to the parietes.

(3) Direct drainage from the open gall-bladder or duct *plus* drainage of the general peritoneal cavity.

Where it has been found impossible to close the wounds in the gall-bladder or ducts, Thornton and others have placed a rubber or other drain beside these wounded organs, and have trusted to this and a drainage-tube placed in Douglas's pouch to remove any biliary material which may have been thrown out into the general peritoneal cavity.

While it must be admitted that pure bile, even in considerable quantity, seems to have but little power to excite peritonitis, it must not be forgotten that in the cases under consideration the bile is practically always mixed with the products of inflammation, and is specially prone to be infected with the *bacillus coli communis.* This being so, drainage by the method just described cannot be considered other than hazardous.

(4) Murphy, of Chicago, has introduced a modification of his well-known button, in which the female half of the instrument is elongated as a drainage-tube, in order to reach from the deep-seated gall-bladder to the parietes. His manner of operating is as follows: "The gall-bladder is located, a sufficient surface of its wall exposed, the contents aspirated, the purse-string suture inserted, the gall-bladder incised, male half of button inserted, purse-string tied and cut short, the tubular portion of button is then pressed into position, the tube is then drawn out as far as the gall-bladder will permit, and held there with a pin passed through the openings in its side. During the time the pressure atrophy in the portion of the gall-bladder clasped between the button is taking place a cicatricial wall is being formed about the tube, which acts as the wall of a sinus after its production, and insures continued protection of the peritoneal cavity."

This operation is extremely ingenious, but in many cases, especially those in which its use would otherwise help us most, it is inapplicable.

If the gall-bladder is deeply seated, and its walls friable, the introduction of the purse-string suture would be difficult or impossible. If the gall-bladder is very small and shrunken, it cannot contain the male half of the button. If the opening is in the duct, the button operation is generally out of the question. For these reasons the Murphy operation must be of very limited utility.

It seems to me that a method of treating cases of stone impacted in the bile-ducts, which I advocated at the last meeting of the Missouri State Medical Society and have since practised, is not open to the above criticisms, while at the same time it is speedy and appears safe.

The description of a case operated on will give the clearest idea of the method advocated.

R. L. J., aged forty-four, car-inspector, was referred to me by Dr. Pettijohn and Wainwright, of Kansas City, who had diagnosed gall-stone disease, and advised operation. It is unnecessary to give the history and symptoms except to note that jaundice had existed for one year. Operation was performed August 4.

The parietal incision over the region of the gall-bladder was vertical. The omentum was found adherent over the site of the gall-bladder, which was difficult to find. The gall-bladder was the size of a small English walnut, and was deeply seated under the liver.

Adhesions were only separated to the extent necessary to expose the gall-bladder and duct. The general peritoneal cavity, where exposed, was carefully protected by gauze pads and the bladder opened. This viscus merely contained a small quantity of pale, sticky fluid, which was removed by gauze sponges. A stone was felt in the cystic duct, near its junction with the hepatic duct, evidently causing the jaundice by pressure exerted on the latter passage. Endeavors to extract this stone through the gall-bladder having failed, the cystic duct was opened, and the stone (the size of a fairly-large pecan-nut) was removed.

Suture of the wounds in the bladder and duct might have been possible, but as it would certainly have taken much time I decided to drain, but at the same time to build up, of omentum, mesentery, and existing adhesions, a diaphragm between the track of the drain and the general peritoneal cavity. Thus the wounded biliary passages were left open, a few stitches of catgut, judiciously placed, bound together the various structures above mentioned in such a way that in a few hours they became an impervious rampart of adhesions, forming a fistula leading from the biliary passages to the skin.

To obviate any danger of the general peritoneal cavity being contaminated while the adhesions were forming, a rubber drain was passed to the bottom of the wound, and surrounded throughout its whole length with a liberal supply of iodoform gauze.

On August 9 the dressings were found soaked with bile. The gauze pack was removed, and not returned. The bowels moved, the fæces being bile-stained for the first time in one year.

The patient made an uninterrupted recovery.

The special features of this operation are,—

(*a*) The preservation, so far as possible, of existing adhesions.

(*b*) The leaving open of the wounds in the gall-bladder and ducts, thus saving time.

(*c*) The formation of a diaphragm composed of peritoneal-covered structures, completely shutting off the general peritoneal cavity from the area operated on.

(*d*) The keeping empty of the cavity bounded by the aforesaid diaphragm and the liver, by means of tubular and capillary drainage.

(*e*) The rapidity, ease, and safety with which an operation by this method can be completed.

Should one find, in course of time, that the obstruction to the flow of bile into the intestine has not been removed, and that an external biliary fistula persists, I can see no reason why this ill also cannot be overcome.

The fistulous track may be gradually or rapidly dilated in part of its course to such a size that an anastomosis can be made between it and a portion of intestine. Such an anastomosis would, preferably, be made by means of the Murphy button, and would permit of the closure of the external fistula. I have had no opportunity as yet to test the correctness of this, but merely offer the suggestion for what it is worth.